

INTER UNIVERSITY ACCELERATOR CENTRE

ARUNA ASAF ALI MARG

POST BOX NO: 10502

NEW DELHI-110067.

NOTICE INVITING TENDER NO. IUAC/NIT/07/PP/2018-19

Name of the work: - : Supply, Installation and Testing of Beam Position Monitors (BPM) for measuring the position of electron beam produced from an electron gun.

No. of Pieces: 5 pieces of Beam position monitors and 3 pieces of compatible read out electronics

Estimated Value: - : 1,30,000 USD (~ 88 Lakhs INR)

Earnest Money Deposit (EMD)*: - : 2,600 USD (~ 1.75 Lakhs INR)

***Bidders registered with NSIC and Foreign Bidders quoting directly are exempted from paying EMD.**

Last Date and Time of Submission of

Tender : 03/08/2018----- at 3.00 p.m.

Date & Time for opening of Tender : 03/08/2018----- at 3.30 p.m.

(Technical bid part-A)

Date & Time for opening of price bid : Will be intimated later on to technically

(Part-B) qualified bidders.

Address for submission of tender : Administrative Officer(S&P),

Inter-University Accelerator Centre

Aruna Asaf Ali Marg

Post Box: 10 502

New Delhi - 110067

Place of Opening of the Tender : Inter-University Accelerator Centre

GENERAL CONDITIONS OF TENDER:

- 1. Submission of Tender:** Tenders should be submitted in sealed envelope in two Parts separately, i.e. "Technical bid" (Part-A) and "Price bid" (Part-B). Both the parts should be further sealed in an envelope super-scribing NIT No & name of work, due date for opening, bidders name & address. The tender duly filled in may be sent to above mentioned address either by post or hand delivered in the **tender box kept in the area near west side entrance, after ensuring that due entries are made in the register kept at the counter.** It should not be handed over to any employee of the Centre. **No tender shall be accepted later than the time schedule specified above.**

Any clarification/amendments/corrigenda etc. to NIT will only be available on website: www.iuac.res.in

- 2. Technical Bid (Part-A) :** In this, the bidder should submit his company profile, organizational setup, credentials, and copies of successfully executed work orders for reputed laboratories during the last five years. No deviations in respect of NIT conditions are acceptable. **The bidders are required to attach entire NIT (except for the price bid part) duly signed & stamped as a token of acceptance to the NIT conditions with this bid. The following specific conditions are essential for pre-qualification:-**

Entire NIT (except Price bid) duly signed & stamped by the bidder.

The bidder must be an internationally reputed firm/company/manufacture or their representative of Beam position monitor devices, who has supplied similar type of system to the internationally reputed laboratories worldwide and in India and carried out similar work in the laboratories worldwide.

The company should supply the complete beam position monitor along with electronics system for measurement of beam position for a light source based accelerator facility as listed in the scope of work. Partial quotation for the individual subsystems will not be accepted. The company should attach a brief justification note to ascertain their capability criteria to undertake the order.

The list of users who have used similar item and model/make along with their name, E-mail address, Institute address & contact numbers should be submitted with the quotation. If the identical or similar equipment have been supplied to other Laboratory/Institute in India/Abroad, the details of such supplies for the preceding five years must be given together with the prices eventually or finally paid. Copies of work orders during the last five years should be included. No deviations from the technical specifications listed in the annexure A will ordinarily be permitted. However, the Centre reserves the right of final decision regarding acceptable technical specifications.

3. **Price Bid (Part-B) :** In this bid, the bidder is required to quote the FOB price of item along with the break up as provided in Annexure C (Part I) for the works mentioned in the scope of work & technical specifications. The bidders should quote unconditional rates, neatly written without any overwriting and duly signed & stamped on all pages. The bidder may have to provide a certificate with the price bid mentioning that the price quoted by them is not higher than that the price quoted by them to other laboratories/institutes for similar product during last year.
4. **Scope Of work/supply:** Supply, Installation and testing of a beam position monitoring system for the operation of a 2860 MHz S –band Normal conducting copper RF photocathode gun for Delhi Light Source as per detailed technical specification and guidelines mentioned in NIT as **Annexure A**.
5. **Validity of Tender:** The prices must be valid for a period of **six months** from the date of opening of the quotation. No escalation of cost will be acceptable in any condition after opening of tender.
6. **Escalation:** No escalation over and above items rates quoted by the bidder shall be paid during the execution of contract.
7. **Pre installation requirements:**–Pre installation requirements like Power Supply, arrangement of rack, cooling requirement, temperature or humidity controller any other essential requirements which are to be kept ready/completed by IUAC before supply and installation of equipment, must be informed by the bidder clearly in their quotation to avoid any delay in Installation & Commissioning of equipment. Operating conditions and environment should clearly be mentioned.

- 8. Inspection:-** The consignment shall be opened in presence of company's representative and inspection of the system will be done by IUAC technical experts/scientists. In case company's representative is not available, the inspection will be done by IUAC team and discrepancy will be intimated to the supplier accordingly. All short supplies will be arranged by the supplier on its own. In case of receipt material in damaged or defective condition, the supplier will have to arrange the replacement of goods free of cost.
- 9. Installation/commissioning:** - Installation of the equipment (only the pickup device) may be the responsibility of IUAC. But the installation, testing and training of the read out electronics to measure the beam position should be provided by the supplier at IUAC within a suitable time period on a mutually agreed basis after delivery of goods at IUAC. The system will be accepted after the testing and no separate charges for installation etc. will be paid to the party beyond the quoted prices. The vendor should clearly mention their charges in the quotation in case their personnel need to visit IUAC to assist the initial performance test.
- 10. Correspondence:** All the correspondence in respect of tender/contractual obligation shall be made to the Admin. Officer (S&P), Inter-University Accelerator Centre, Aruna Asaf Ali Marg, New Delhi-110067 E-mail: joseph@iuac.res.in, Ph. +91-11-24126018,24126022
- 11. Terms of Payment:** L/C will be opened for 100 % of FOB value after receipt of acceptance of order from successful bidder. 70% of payment will be released against presentation of complete shipping documents. Balance 20% of order value shall be released after satisfactory installation, commissioning and testing of the equipment. Remaining 10% will be released after the warranty period OR against a Performance Bank Guarantee equivalent to 10% value and valid for the warranty period plus two months.
- 12. Post Warranty Period:** Extended warranty for a period of five years of post-warranty with required spares should be offered. During this period of, it should be specified that who will be the authorized personnel for servicing/maintenance etc. The response time for attending a fault should be within 3 days in case of Indian agent and 2 weeks in case

of foreign workers. In such cases the supplier will pay the travel, lodging, transportation of faulty parts charges etc.

13. Manpower Training: IUAC Scientist/Engineers will be trained at supplier's site and/or at IUAC site during installation and testing. The detailed schedule time needs to be conveyed by the supplier well in advance. The cost of training of the IUAC personnel at the site of the company including their travel by economy class, accommodation etc. will be taken care by IUAC.

14. Spares: Supplier should quote separately as option for spares required for trouble free operation of the beam position monitoring system round the clock for 5 years. Some of the major spares should be listed along with financial quote. All the additional spare item cost will not be included for comparative purpose.

15. Documents and Manual:

- i. Upon delivery of the beam position monitoring system to IUAC, two sets of as built, signed, final prints of Electrical assembly and testing of systems shall be supplied by the vendor. These prints shall be made to the highest professional standards. All drawings shall also be delivered on CD/pen drive.
- ii. Upon delivery of the beam position monitoring system to IUAC, two copies of the final parts list shall be supplied by the vendor. It shall also include a recommended critical spare parts list and test routine/schedule for such spares if they are to be stored. The data shall include current unit price and supplier of all component parts. All parts lists shall also be delivered on CD in either MS Word or MS Excel format.
- iii. Upon delivery the vendor should provide the guarantee documents mentioning all the terms and conditions in details.
- iv. All the information along with all test results, technical descriptions, data sheets shall be supplied in a bound design and operations manual.
- v. Set of documents must include operating manuals, safety manuals, periodic maintenance, troubleshooting manuals and maintenance procedure.
- vi. Any other documentation necessary for safe and reliable operation of the equipment should also be supplied. Two sets of the manual should be provided without additional cost.

- 16. Software and application:** All the software installations required for measurement and operation of the beam position monitors will be done at IUAC. All the application and development software including OS, drivers etc. with required license with installable media (if applicable) should be supplied.
- 17. Final Acceptance:** The final acceptance of the system is defined as successful completion of shipment, installation and acceptance tests at IUAC to substantiate compliance with the specification mentioned in annexure A. Complete system with all the accessories and spare parts should reach to IUAC safely with all the mentioned warranty intact.
- 18. Guarantee/ Quality Assurance**
1. The Vendor shall furnish a manufacturing plan and acceptance test procedures to be approved by IUAC. Approval by IUAC shall not release the Vendor from his responsibility for conceptual design, manufacturing, or any other mistakes committed in the fabrication of the Beam Position Monitoring system.
 2. All purchased articles from subcontractors or manufacturers released for inclusion in this BPMsystem shall be clearly identified to indicate conformance to Vendor's receiving inspection.
 3. The bidder should guarantee for the works/items executed/supplied by him from the manufacturing/engineering defect and bad material/workmanship for a period of at least one year from the date of successful installation at the IUAC. During this period if any replacement of items and/or repairs/rectification is needed, he shall make the same free of cost.
 4. Only calibrated test equipment shall be used. Copies of the test data sheets shall include lists of the instruments used to perform the tests and the calibration due date of each instrument.
 5. The Vendor shall establish those controls and processes necessary to ensure uniformity of all deliverable articles. All controls, inspections, tests and quality provisions established during development and pre-production tests shall be indicated on the applicable drawing and shall be performed on each deliverable article.
 6. All units and parts of the equipment shall be properly packaged and delivered in an undamaged condition to IUAC.

- 19. Force Majeure:** IUAC may grant an extension of time limit set for the completion of the work in case timely completion of the work is delayed by force majeure beyond the supplier's control. Force majeure is defined an event of effect that cannot reasonably be anticipated such as acts of God (like earthquakes, floods, tsunami etc.), the direct and indirect consequences of wars (declared or undeclared), national emergencies, civil commotions and strikes (only those which exceeds a duration of ten continuous days) at successful Tenderer's factory. Apart from the extension of the time limit, force majeure does not entitle the successful Tenderer to any relaxation or to any compensation of damage or loss suffered.
- 20. Liquidated damages:** In case the delivery of the listed items is delayed beyond the specified delivery period for reasons attributable to the supplier, deductions on account of liquidated damages @ **0.5 %** per week of the total order value will be deducted subject to maximum 5% of the total order.
- 21. IUAC reserves the right** to reject any or all the tenders in full or in part without assigning any reasons whatsoever, and the decision of the Centre in this regard will be binding on all the bidders. Tenders not complying with any of the provisions stated in this tender document are liable to be rejected. **Director, IUAC reserves the right to accept or reject any tender without assigning any reason and does not bind himself to accept the lowest tender.**
- 22. This contract shall be governed by the Indian laws. Any dispute arising out of this contract will be subjected to jurisdiction of New Delhi/Delhi.**

Accepted

(Signature of bidder)

Annexure A

Specification of Beam Position Monitor(BPM) System and its support electronics for Delhi Light Source (DLS) at IUAC

Table-1: Quantity of BPM system required.

SL. No.	Item	Qty.
1.	BPM pick up device	5 Nos.
2.	BPM readout electronics and its associated items	3 Nos.

Table-2: Specification of BPM system.

Sl. No.			Qty.
1	<p>BPM System should have the following features:</p> <ul style="list-style-type: none">• Crate based/Standalone acquisition/signal processing electronics system.• Should be able to measure the position of each individual electron pulse separated by 200 ns (as shown in figure-1 in Annexure-B) with a position resolution of 5 micron RMS or better at the operating bunch charge.• Should be able to separately measure the average position of 15 electron pulses with a frequency of ~ 6.25 Hz.• UHV (1×10^{-10} mbar) compatible.	Details as per Table-3, Table-4 and Table -5.	5 No. s of pick up device and 3 Nos. of readout support electronics.
2	Details of Beam Structure, micro/macro pulse	As per Annexure B	

	concept of DLS		
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The system should include,

1. Pick up device (5 Nos.) i.e. Stripline BPM pick up (the vendor should provide the CMM certificate for the parallelism measurements for both side mating CF flanges).
2. Support electronics (3 Nos.) to read the position of individual electron pulse.
3. Graphical User Interface for easy position read out and control.
4. Connecting RF cables from beam line to the electronics site (~ 20 meters).

Table-3. Required major specification of BPM Hardware

Sl.	Parameter	Desired Value	Offered Value
1	Flange Type and dimension	CF 2.75"	
2	Output Connector type	SMA (F)	
3	Pipe Diameter (OD)	DN 40	
4	Calibration and Testing kit	As per compatibility	
5	Vacuum level Temperature level Baking Temperature	~5X 10 ⁻¹¹ mbar Ambient Temperature < 100 C	

BPM Hardware must be supplied with:

- Proper, well shielded connecting RF cables Shielded RF cables between BPM pick up device and Acquisition Electronics system.

BPM Signal Processing/Acquisition Electronics

Table-4. Required major specification of Digital Board

Sl.	Parameter	Desired Value	Offered Value
1	Input Sensitivity	Should be able to measure the position of each individual electron bunch separated by 200 ns with a position resolution of ~ 5 micron RMS or better at the operating beam bunch charge. The minimum and maximum charge of each e-bunch may vary between 1 to 500 pC.	
2	TRIGGER In	On-board or External source, synchronized to BPM signal.	
3	Calibration Mode	Yes	
4	Total number of input channel	4	
5	ADC resolution	14 bit or better	
6	ADC sampling frequency	More than 100 MHz	

7	Memory size	8Gbit	
8	Remote Control	Ethernet/TCP-IP/USB/RS-232/RS 485	
9	Driver Software for Control	Yes (Preferably EPICS based control GUI)	

Electronics system must be supplied with:

- FPGA/Microcontroller based system with provision for user programmability
- Proper signal conditioning outputs available.
- Standalone or Crate based system compatible to 19” Standard Rack.
- TCP/IP and/or USB/RS232/RS485 connection interface should be located in the front panel.
- Proper Fan based cooling arrangement

Table-5. Power Supply Considerations

Sl.	Parameter	Desired Value	Offered Value
1	Power Supply	230 V AC \pm 10%, 15 A (Max),	
2	Power Consumption	As per design	
3	Operating Environment	Temperature: 0 °C – 27 °C Relative Humidity: 0 % – 80 %	

Important notes about the system:

1. Complete system assembly must be compatible to 19 inch rack mount and modular in nature.
2. Appropriate test points and proper test mechanism/manual must be provided.
3. Standard interfaces like USB, LAN should be available.
4. Hardware reference manual for operation, maintenance, and control of equipment should be provided.
5. Factory based Calibration and Test Report must be provided.
6. Hardware Warranty and life cycle with AMC options, terms and conditions must be clearly mentioned.
7. Installation of BPM pickup device may be the responsibility of IUAC. But the installation, testing and training on the BPM electronics should be provided by the company.

Annexure B:

The Delhi Light Source (DLS) is a pulsed electron machine based on pre-bunched free electron laser. The beam structure for DLS is shown in figure-1.

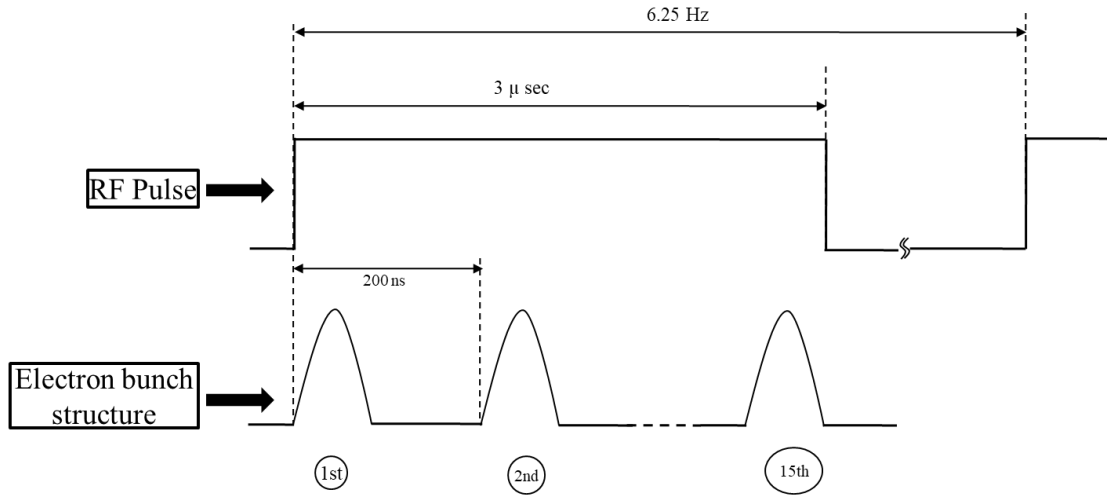


Figure-1: schematic of electron beam structure for DLS.

Beam Parameter:

Beam Specification	Min	Max	Typical
Beam Energy	2 MeV	10 MeV	7 MeV
Total charge per electron pulse (coming within 10 ps and will be repeated in every 200 ns)	1 pC	500 pc	240pC
Total charge in one RF cycle (15 electron pulse train) (within ~ 3 micro-sec)	15 pC	7.5 nC	3.6nC
Transverse Beam size	2 mm	5mm	3mm

Annexure C:

Price Bid for Beam Position Monitor (BPM) System and its support electronics for Delhi Light Source (DLS) at IUAC

Sl. No.	Items	FOB Price in USD/Euro
1.	Complete BPM System consisting of 5 Nos. of pick device (stripline type), 3 Nos. of support Electronics system, graphical user interface, connecting RF cables (~20 meters) and calibration unit (Price Break-up for individual items should be provided)	
2.	Commissioning, Training and Site Acceptance Test	
3.	Installation, testing and training of BPM electronics at customer's site.	
4.	Extended warranty (beyond normal warranty)	
5.	Cost of Spare Parts, Extra cables etc. (break up can be provided in separate sheet)	
	Total	